Simulation Project Analysis
CSCI-4210
Operating Systems

Mitesh Kumar <kumarm4>, Jason Lam <lamj7>, William He <hew7>

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1 Best Algorithm for CPU-bound vs I/O-bound Processes

2 RR Algorithm With rr_{add} set to BEGINNING vs END

3 Comparison Between SJF and SRT

4 Limitations of Our Simulation

5 Priority Scheduling Algorithm of Our Own Design

6 Appendix

Program Arguments

[executable] [n] [seed] [λ] [limit] [t_{cs}] [α] [t_{slice}] [rr_{add}: BEGINNING or END, default: END]

Program Execution Data

Table 1: I/O bound [n:1] [seed:2] [λ:0.01] [limit:256] [t_{cs}:4] [α:0.5] [t_{slice}:128]

Algorithm	Average CPU Burst Time (ms)	Average Wait Time (ms)	Average Turnaround Time (ms)	Total Number of Context Switches	Total Number of Preemptions	CPU Utilization (%)
FCFS	286.957	82.3043	373.261	23	0	39.3185
SJF	286.957	87.5217	378.478	23	0	38.5514
SRT	286.957	87.5217	378.478	23	0	38.5514
RR	286.957	95.6522	388.87	36	13	38.1856

Table 2: I/O bound [n:16] [seed:2] [λ:0.01] [limit:256] [t_{cs}:4] [α:0.75] [t_{slice}:64]

Algorithm	Average CPU Burst Time (ms)	Average Wait Time (ms)	Average Turnaround Time (ms)	Total Number of Context Switches	Total Number of Preemptions	CPU Utilization (%)
FCFS	286.957	82.3043	373.261	23	0	39.3185
SJF	286.957	87.5217	378.478	23	0	38.5514
SRT	286.957	87.5217	378.478	23	0	38.5514
RR	286.957	93.6957	389.174	49	26	38.1062

Table 3: I/O bound [n:8] [seed:64] [λ:0.001] [limit:4096] [t_{cs}:4] [α:0.5] [t_{slice}:2048]

Algorithm	Average CPU Burst Time (ms)	Average Wait Time (ms)	Average Turnaround Time (ms)	Total Number of Context Switches	Total Number of Preemptions	CPU Utilization (%)
FCFS	286.957	82.3043	373.261	23	0	39.3185
SJF	286.957	87.5217	378.478	23	0	38.5514
SRT	286.957	113.522	405.174	27	4	38.5424
RR	286.957	82.3043	373.261	23	0	39.3185

Table 4: I/O bound [n:8] [seed:64] [λ:0.001] [limit:4096] [t_{cs}:4] [α:0.5] [t_{slice}:2048]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	286.957	82.3043	373.261	23	0	39.3185
SJF	286.957	87.5217	378.478	23	0	38.5514
SRT	286.957	113.522	405.174	27	4	38.5424
RR	286.957	156.217	447.174	23	0	38.6281

Table 5: I/O bound [n:8] [seed:64] [λ:0.001] [limit:4096] [t_{cs}:20] [α:0.5] [t_{slice}:2048]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	286.957	88.4783	395.435	23	0	38.9841
SJF	286.957	95.8696	402.826	23	0	38.1944
SRT	286.957	106.522	416.087	26	3	38.1503
RR	286.957	163.87	470.826	23	0	38.3053

Table 6: CPU bound [n:1] [seed:2] [λ:0.01] [limit:256] [t_{cs}:4] [α:0.5] [t_{slice}:128]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	1629.22	3216.87	4850.09	23	0	98.0326
SJF	1629.22	2596.35	4229.57	23	0	94.7603
SRT	1629.22	2543.57	4178.17	31	8	94.6836
RR	1629.22	2249.39	3913.57	201	178	92.0236

Table 7: CPU bound [n:16] [seed:2] [λ:0.01] [limit:256] [t_{cs}:4] [α:0.75] [t_{slice}:64]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	1629.22	3216.87	4850.09	23	0	98.0326
SJF	1629.22	2596.35	4229.57	23	0	94.7603
SRT	1629.22	2543.57	4178.17	31	8	94.6836
RR	1629.22	2327.13	4024.17	390	367	90.0683

Table 8: CPU bound [n:8] [seed:64] [λ:0.001] [limit:4096] [t_{cs}:4] [α:0.5] [t_{slice}:2048]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	1629.22	3216.87	4850.09	23	0	98.0326
SJF	1629.22	2730.65	4363.87	23	0	95.3146
SRT	1629.22	2017.39	3652.35	33	10	94.6645
RR	1629.22	2829.35	4463.78	30	7	95.2468

Table 9: CPU bound [n:8] [seed:64] [λ:0.001] [limit:4096] [t_{cs}:4] [α:0.5] [t_{slice}:2048]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	1629.22	3216.87	4850.09	23	0	98.0326
SJF	1629.22	2730.65	4363.87	23	0	95.3146
SRT	1629.22	2017.39	3652.35	33	10	94.6645
RR	1629.22	1743.61	3378.04	30	7	95.6162

Table 10: CPU bound [n: 8] [seed: 64] [λ: 0.001] [limit: 4096] [t_{cs}: 20] [α: 0.5] [t_{slice}: 2048]

Algorithm	**Average CPU Burst Time (ms)**	**Average Wait Time (ms)**	**Average Turnaround Time (ms)**	**Total Number of Context Switches**	**Total Number of Preemptions**	**CPU Utilization (%)**
FCFS	1629.22	3255.13	4904.35	23	0	97.0978
SJF	1629.22	2761.26	4410.48	23	0	94.4307
SRT	1629.22	2057.74	3715.65	33	10	93.4184
RR	1629.22	2876.65	4531.96	30	7	94.0987